SECTION 32 92 00 – TURF AND GRASSES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Types of work required include the following:
1. Soil Testing
2. Placing topsoil
3. Soil conditioning
4. Finish grading
5. Seeding
6. Sodding
7. Replanting unsatisfactory or damaged areas
8. Maintenance

B. Restoration of disturbed, non-paved areas.

1.02 REFERENCES

A. American Association of State Highways and Transportation Officials (AASHTO).
1. Pennsylvania Department of Transportation Publication 408 Specifications.
2. Pennsylvania Seed Act of 1965, Act 187, as amended.
3. Agricultural Liming Materials Act of 1978, P.L. 15, No. 9 (3 P.S. 132-1), as amended.
4. Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3 P.S. 68.2), as amended.
5. Rules for Testing Seeds of the Association of Official Seed Analysts.

1.03 SUBMITTALS

A. Contractor's Qualifications: Submit Contractor's Qualifications complying with requirements of 1.04 Quality Assurance.

B. Samples:
1. When directed, furnish three strips of sod, 4-1/2 feet long by 12" wide, laid on 3" of topsoil and tamped in place. The samples shall be representative of the sod and workmanship to be provided.
2. Advise the Engineer of the location of the field, and area within the field, from which the sod is to be taken for approval.

C. Certificates:
1. Prior to use or placement of material, submit certifications of material composition of the following for approval:
a. Seed mixture(s): certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.

b. Fertilizer
c. Lime

2. If soil tests are performed to justify decreased liming and fertilizer rates, submit certified soil sample analyses, including laboratory's recommended soil supplement formulation.

D. Topsoil Analysis Report: Contractor is responsible to have on-site topsoil and imported topsoil tested by qualified agronomist. Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
2. Copies of test results and recommended soil amendments are to be submitted to the Engineer for review and written response a minimum of 10 days prior to commencing work.
3. Ideal Topsoil Nutrients: All topsoil for lawns (both on-site and new) to receive proper amendments so nutrients fall within the following guidelines:

Parameter /Element	**Range**
pH	6.8
P O	300 ppm
KO	3.5%
Ca	65%
Mg	10%
B	1.2 ppm
Fe	200 ppm
Mn	20-85 ppm
Cu	0.5-3.0 ppm
Zn	3-10 ppm

E. As part of “Close out activities” contractor shall provide a log depicting the following:

1. Soils analysis reports including date of test and locations.
2. Type of seed mixture.
3. Amendments applied.
4. Dates of application and seeding.
5. Dates and type of maintenance activities performed including mowing.

1.04 QUALITY ASSURANCE

A. Testing Agency:

1. An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that

specializes in types of tests to be performed.

2. The Contractor has the option to use soil testing to justify decreasing lime and fertilizer rates. When soil testing is selected by the Contractor, the soil and soil supplement testing shall be performed by a Soils Testing Laboratory engaged and paid for by the Contractor and approved by the Engineer. Collect soil samples under the direction of the Engineer.

B. Subcontract seeding and lawn work to a single firm specializing in lawns and seeding work.
   1. The Contractor shall have been actively and directly engaged in constructing natural turf lawns for a period of five (5) years or more, and provide proof of five (5) or more installations completed by them which have been in use for three (3) or more years.
   2. In addition, the Owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request.
   3. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work specified herein.

C. Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.

D. Analysis and Standards: Package standard products with manufacturer have certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

E. Pre-Installation Meeting: A pre-installation meeting shall be scheduled, in writing, between the Prime Contractor, Subcontractors and the Engineer to review the scope of work in this Section, coordination with other work, special project conditions and quality standards. It shall be the Prime Contractor's responsibility to notify and schedule the pre-installation meeting with the Engineer a minimum of two (2) weeks prior to the anticipated start of the work specified under this Section.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Seed:
   1. Deliver seed fully tagged and in separate packages according to species or seed mix. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

B. Sod:
   1. Deliver sod to the project site within 24 hours after being cut and place sod within 36 hours after being cut. Do not deliver small, irregular, or broken pieces of sod.
   2. During wet weather, allow sod to dry sufficiently to prevent tearing during handling and placing. During dry weather, moisten sod to ensure its vitality and

to prevent dropping of the soil during handling. Sod which dries out will be rejected.

1.06 PROJECT CONDITIONS

A. Restore unpaved surfaces to a condition similar to that prior to excavation.

B. Refer to Drawings and Special Conditions for sodding or seeding requirements at each specific location of Work.

C. Proceed with and complete seeding work as rapidly as portions of site become available, working within seasonal limitations for each kind of seeding work required.
   1. Planting Time: Permanent grass to be seeded no later than May 15th for Spring seeding and only between September 1 and October 15 for Fall planting. Athletic Fields must be seeded during the Fall season (i.e., September 1-October 15) unless approval is granted by Engineer otherwise.
   2. Temporary grass seeding is required if areas are exposed for longer than 20 days or areas are not permanently established prior to the Winter season.

D. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Engineer before seeding.

E. Coordination with Lawns: Trees and shrubs should be planted after final grades are established and prior to planting of lawns, unless otherwise acceptable to the Engineer. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.07 COMPLETION OF INSTALLATION AND ACCEPTANCE

A. Completion of Installation shall consist of all operations including topsoil testing, analysis and submittal, topsoil preparation, removal of stones and all extraneous objectionable material, application of soil amendments and fertilizers, planting grass seed, mulching and erosion mats in accordance with requirements. At the completion, 50% of the value is eligible for payment.

B. Acceptance of lawns shall be after minimum maintenance is completed when a full, even, healthy, uniform, close, stand of specified grass has been established at least 2½ inches in height free of weeds, stones, disease, bare spots, and surface irregularities. A written statement will be provided by the Engineer when this is achieved. At the time these conditions are met, the remaining 50% of the value is eligible for payment.

1.08 PROJECT WARRANTY

A. Warrant lawns and grasses through specified maintenance periods, until written notice of acceptance is provided.
   1. The Contractor shall maintain all lawns until acceptance (a minimum of 3 mowings or as many as necessary). Repair eroded areas and reseeds all seeded

areas until acceptance is achieved.

2. Any bare spots or areas not meeting the criteria for acceptability prior to acceptance shall be scarified, refertilized and seeded at no additional cost to Owner.
3. All areas where damage occurs due to erosion shall be scarified and filled in evenly with the same kind of topsoil, and the soil prepared and reseeded as originally specified including permanently eliminating all depressions at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Having a pH of between 6.0 and 7.0; containing not less than 2% nor more than 10% organic matter as determined by AASHTO T194.

B. Fertile friable loam, sand loam, or clay loam which will hold a ball when squeezed with the hand, but which will crumble shortly after being released.

C. Free of clods, grass, roots, or other debris harmful to plant growth.

D. Free of pests, pest larvae, and matter toxic to plants.

2.02 FERTILIZER

A. Basic Dry Formulation Fertilizer: Analysis 0-20-20 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

B. Starter Fertilizer: Analysis 10-5-5 or 12-6-6 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

2.03 LIME

A. Pulverized Agricultural Limestone. Conforming to the requirements of the Agricultural Liming Materials Act of 1978, P.L. 15, No. 9, as amended; The Agricultural Liming Materials Rules and Regulations (Title 7-Part V); 7 PA Code, Chapter 108 for labeling requirements; and as follows:
   1. 50% Total oxides (total calcium oxide and magnesium oxide equivalent) (ASTM C 25)
   2. 89% Calcium carbonate equivalent (% by weight) (ASTM C 25)
   3. Fineness (minimum % by weight)
      a. 95% passing No. 20 sieve
      b. 60% passing No. 60 sieve
      c. 50% passing No. 100 sieve

B. Furnish material having an Effective Neutralizing Value (ENV) of not less than 90 when calculated according to 7 PA Code Chapter 108 as follows:
   1. ENV = (a) + (b) + (c) x CCE divided by 100

a. (a) = % by weight passing 20 mesh - % passing 60 mesh x 0.4
b. (b) = % by weight passing 60 mesh - % passing 100 mesh x 0.8
c. (c) = % by weight passing 100 mesh x 1.0
d. CCE (Minimum Calcium Carbonate Equivalent) = % by weight of calcium carbonate

2.04 SEED

A. Fresh, clean, dated material from the last available crop and within the date period specified, with a date of test not more than 9 months prior to the date of sowing. Percentage of pure seed present shall represent freedom from inert matter and from other seeds distinguishable by their appearance. All seeds will be subject to analysis and testing.

B. See "Seeding Table" at end of this Section.

2.05 INOCULANT

A. Inoculate leguminous seed before seeding with nitrogen fixing bacteria culture prepared specifically for the species.

B. Do not use inoculant later than the date indicated by the manufacturer.

C. Protect inoculated seed from prolonged exposure to sunlight prior to sowing.

D. Re-inoculate seed not sown within 24 hours following initial inoculation.

2.06 MULCHING MATERIALS

A. Mulches for seeded areas shall be one, or a combination of, the following:
1. Organic Compost
2. Peat
3. Mushroom Manure
4. Wood Cellulose

2.07 SOD

A. At least three year old, well-rooted Kentucky Bluegrass (Poa pratensis) sod containing a growth of not more than 10% of other grasses and clovers.

B. Free from noxious weeds such as bermuda grass, wild mustard, crab grass, and kindred grasses.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE

A. "Hard pan" or heavy shale:

1. Plow to a minimum depth of 6".
2. Loosen and grade by harrowing, discing, or dragging.
3. Handrake subgrade. Remove stones over 2" in diameter and other debris.

B. Loose loam, sandy loam, or light clay:
1. Loosen and grade by harrowing, discing, or dragging.
2. Handrake subgrade. Remove rocks over 2" in diameter and other debris.

3.02 PLACING TOPSOIL

A. Limit preparation to areas that will be planted in immediate future. Any prepared areas not immediately planted must be re-prepared.

B. Avoid any excessive heavy traffic over topsoil.

C. Do not place topsoil when the subgrade is frozen, excessively wet, or extremely dry.

D. Do not handle topsoil when frozen or muddy.

E. Replace topsoil and spread over the prepared subgrade to obtain the required depth and grade elevation. Final compacted thickness of topsoil not less than 4 inches.
1. If topsoil is hardened, loosen to a minimum depth of 4 inches.
2. Mechanically and/or manually, remove stones larger than 1 inch in any dimension, sticks, roots, rubbish, and other extraneous matter, throughout process of preparation prior to seeding,

3.03 TILLAGE

A. After seed bed areas have been brought to proper compacted elevation, thoroughly loosen to a minimum depth of 4 inches by discing, harrowing, or other approved methods. Do not work topsoiled areas when frozen or excessively wet.

B. Liming:
1. Distribute limestone uniformly at a rate of 100 pounds per 1,000 square feet.
2. Thoroughly incorporate into the topsoil to a minimum depth of 4".

C. Basic Fertilizer:
1. Distribute basic fertilizer uniformly at a rate of 50 pounds per 1,000 square feet.
2. Incorporate into soil to depth of 4" by approved methods.
3. Incorporate as part of tillage operation.

D. Liming and Fertilizer rates may be decreased if lesser rates are indicated by soil tests provided by the Contractor.

3.04 FINISH GRADING

A. Limit fine grading to areas, which can be planted immediately after grading.

B. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture.

C. Roll, rake, and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Remove stones and extraneous matter and objects larger than 1” in any dimension and dispose.

D. Uniformly grade surface to the required contours without the formation of water pockets.

E. Rework areas which puddle by the addition of topsoil and fertilizer. Re-rake.

F. Distribute starter fertilizer at the following rates, incorporating into the upper 1" of soil:
10-5-5: 50 pounds per 1,000 square feet.
12-6-6: 33 pounds per 1,000 square feet.

G. Re-grade, re-firm and rake the soil surface. This is a smoothing and leveling operation to establish the final surface contours and elevations.

H. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading prior to planting.

I. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn and grass planting as follows: Till to a depth of at least 6 inches. Apply soil amendments and initial fertilizers as specified and mix thoroughly into top 4 inches of soil. Remove high areas and fill in depressions eliminating irregularities. Till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots, and other extraneous matter.
   1. Before preparing of unchanged areas, remove existing grass, vegetation, and turf. Legally dispose of such material off of Owner’s property; do not turn over into soil being prepared for lawns.

3.05 SEEDING

A. Uniformly sow specified seed mix by use of approved hydraulic seeder, power-drawn drill, power-operated seeder, or hand-operated seeder or by hand. Do not seed when winds are over 5 mph. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other

B. Upon completion of sowing, cover seed to an average depth of 1/4" by hand reraking or approved mechanical methods.

3.06 MULCHING

A. Uniformly place organic compost, peat, or mushroom manure at a rate of one cubic yard per 1000 square feet.

B. Apply wood cellulose fiber hydraulically at a rate of 320 pounds per 1,000 square yards.
   1. Incorporate as an integral part of the slurry after seed and soil supplements

have been thoroughly mixed.

C. When mulch is applied to grass areas by blowing equipment, the use of cutters in the equipment will be permitted to the extent that a minimum of 95% of the mulch is 6" or more in length. For cut mulches applied by the blowing method, achieve a loose depth in place of not less than 2".

D. Anchor mulch by application of Hydro-Spray TAC in accordance with manufacturer's recommendations. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean such areas where damage occurs.

E. At time of application and until acceptance do not allow mulch to accumulate in concentrated areas i.e. ponding from rain, wind, etc., to avoid depletion of nitrogen as a result of mulch decomposition. If such conditions develop, Contractor shall be responsible for providing additional amendments to remedy the situation.

3.07 SODDING

A. Prior to sod placement, complete soil preparation or topsoiling.

B. Apply lime and fertilizer as specified. Work into the soil a minimum of 2".

C. Do not place sod when the temperature is lower than 32 degrees F.

D. Hand place sod with tight joints without overlap. Transverse joints shall be broken/ staggered.

E. Place sod so that the top of the sod is flush with the surrounding grade.

F. Use of tools which damage the sod or dumping of sod from vehicles will not be permitted.

G. Water sod to the saturation point immediately after placement.

H. After watering, tamp with an approved tamper to close all joints and ensure close contact between sod and sod bed. After tamping, the sod shall present a smooth, even surface free from bumps and depressions. If so directed, use a light roller, weighing not more than 65 pounds per foot of roller width to complete firming and smoothing the sod.

I. When placing sod in ditches, place the strip with the long dimension at right angles to the flow of water. At any point where water will start flowing over a sodded area, the upper edge of the sod strips shall be turned into the soil below the adjacent area and a layer of compacted earth placed over this juncture to conduct the water over the edge of the sod.

J. In ditches and on slope areas, stake each strip of sod securely with at least 1 wood stake for each 2 square feet of sod. Stakes shall be 2" by 1" with a length of 8" to 12". Drive stakes flush with the top of the sod, with the long face parallel to the slope contour.

3.08 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.

B. Provide fertilizer, seed or sod, and soil amendments as specified for new lawns and as required to provide satisfactorily reconditioned lawn. Provide new planting soil as required to fill low spots and meet new finish grades.

C. Cultivate bare and compacted areas thoroughly to provide a planting bed depth of 6 inches.

D. Remove diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, stone, gravel, and other construction materials; replace with new topsoil. Legally dispose of removed material off site.

E. Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps, cultivate soil, fertilize, and seed. Remove weeds before seeding. If weeds are extensive, apply selective herbicides as required. Apply a seedbed mulch, if required, to maintain moist condition.

3.09 MAINTENANCE BY CONTRACTOR

A. Erect barricades and warning signs as required to protect newly planted areas from pedestrian and vehicular traffic. Maintain barricades throughout maintenance period until lawn is accepted.

B. Maintenance includes watering, weeding, cleanup, edging and repair of depressions, washouts or gullies.

C. Contractor shall begin maintenance of lawns immediately after each area is planted and provide the equipment and labor necessary to mow and irrigate all seeded areas until acceptance in accordance with conditions of Substantial Completion.
   1. Seeded lawns:
      a. If seeded in Fall and not considered acceptable at that time, continue maintenance during following Spring until Substantial Completion of lawn.
      b. Acceptable lawn is defined under project warranty by Substantial Completion.

D. Maintain all lawns by fertilizing, weeding, mowing and other operations such as rolling, regrading, re-planting as required to establish a smooth, acceptable lawn, free of eroded or bare areas. Remove all stones 1" and larger in any dimension and legally dispose of offsite.

E. Re-mulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.

F. Those areas which do not show a prompt catch or grass within 14 days of seeding or sodding shall be re-seeded or re-sodded until complete grass catch occurs.

G. Mow lawns as soon as there is enough top growth to cut with mower. Provide a minimum of three mowings as required to maintain specified height. Remove no more than 35 percent of grass leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowings to maintain grass height of 2½ inches to 3 inches high. Do not mow to less than 2½ inches in height.

H. Apply second fertilizer application 3 to 4 weeks after seeding emergence and when grass is dry.
   1. Use fertilizer that will provide at least 1.0 lb. of actual nitrogen per 1,000 sq. ft. of lawn area.

3.10 FINAL COMPLETED

A. When work is finally completed, including maintenance, Engineer will, upon request, make an inspection to determine acceptability.
   1. Lawn work may be inspected for acceptance in parts agreeable to Engineer, provided work offered for inspection is complete, including specified maintenance requirements.
   2. Acceptance of lawns is defined elsewhere in this section.

B. Replant rejected work and continue specified maintenance until re-inspected by Engineer and found to be acceptable.

C. “Final completed” seeded lawns will be acceptable provided maintenance, and warranty requirements have been met.

END OF SECTION